

We claim:

1. A method of extending the frequency range of a microphone array embedded
 5 in a diffracting object beyond a microphone spacing limitation of $\lambda/2$, where
 λ =acoustic wavelength, comprising:
 configuring said diffracting object to obtain a desired high frequency
 directivity response at predetermined microphone positions on said diffracting object;
 providing a low frequency beamformer operable at said predetermined
 10 microphone positions to achieve a desired low frequency directivity response; and
 applying linear constraints to said beamformer for providing a smooth
 transition between said low and high frequency directivity responses.
2. The method of claim 2, comprising applying a thin layer of acoustic absorbent
 15 material to the surface of said diffracting object to absorb sound at high frequencies.
3. The method of claim 2, wherein said acoustic absorbent material is applied
 between respective ones of said microphones.
- 20 4. The method of claim 3, wherein said acoustic absorbent material is applied to
 a thickness of about $\lambda/4$ or higher to trap sound waves of wavelength λ .
5. A conferencing unit, comprising:
 an array of microphones embedded in a diffracting object configured to
 25 provide a desired high frequency directivity response at predetermined microphone
 positions on said diffracting object; and
 a low frequency beamformer operable at said predetermined microphone
 positions to achieve a desired low frequency directivity response, wherein said
 beamformer is linearly constrained to provide a smooth transition between said low
 30 and high frequency directivity responses.

6. The conferencing unit of claim 5, further including a thin layer of acoustic absorbent material applied to the surface of said diffracting object to absorb sound at high frequencies.

5 7. The conferencing unit of claim 6, wherein said acoustic absorbent material is applied between respective ones of said microphones.

8. The conferencing unit of claim 7, wherein said acoustic absorbent material is applied to a thickness of about $\lambda/4$ or higher to trap sound waves of wavelength λ .

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9. The conferencing unit of claim 6 wherein said acoustic absorbent material is one of either open cell foam or felt.

10. The conferencing unit of claim 5, wherein said beamformer is linearly
15 constrained using two symmetrical look directions $d_{\theta-\alpha}$ and $d_{\theta+\alpha}$ with a gain constraint less than one where the spacing $\theta-\alpha$ and $\theta+\alpha$ is controlled by α which increases with frequency.

11. The conferencing unit of claim 10, wherein said gain constraint is
20 approximately 0.707.

12. A method of extending the frequency range of a wave sensor array embedded in a diffracting object beyond a inter sensor spacing limitation of $\lambda/2$, where λ =acoustic wavelength, comprising:

25 configuring said diffracting object to obtain a desired high frequency directivity response at predetermined sensor positions on said diffracting object;
providing a low frequency beamformer operable at said predetermined sensor positions to achieve a desired low frequency directivity response; and
applying linear constraints to said beamformer for providing a smooth
30 transition between said low and high frequency directivity responses.